24 - EFFECT OF SUPPLEMENTATION WITH DEXTRAN ON GLICEMIC LEVELS IN TYPE EXPERIMENTAL 2 DIABETES

GABRIEL FERNANDO ESTEVES CARDIA;
PABLO JORDÃO RODRIGUES;
SAULO EUCLIDES DA SILVA-FILHO;
RICARDO ALEXANDRE SPIRONELLO;
ROBERTO KENJI NAKAMURA CUMAN
Laboratório de inflamação, Departamento de Farmacologia e Terapêutica da
Universidade Estadual de Maringá – Maringá – PR – BRASIL
g_cardia@hotmail.com

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INTRODUCTION

The ergogenic nutritional supplements are those that can promote increased physical performance beyond the physiological capacity and have a thermogenic action in the body, or that increase the body temperature (SAHLIN, 2014). This causes increase basal metabolic rate and consequently contribute to weight loss and body fat. Individuals with illnesses who practice physical activity when they have their requirements increased considerably due to the conditions of more energy expenditure peculiar disease. The ergogenic nutritional supplements are those that can promote increased physical performance beyond the physiological capacity. They are for example albumin, wheyprotein, casein, soy protein, brewer's yeast, maltodextrin, dextrose and creatine. Dextran, an ergogenic, is rapidly absorbed and also releasing immediate energy to the body, to the muscles replenishing energy stores and muscle glycogen expended during physical activity. Has easily digestible and can be used immediately after workouts serving as an adjunct in the absorption of other nutrients such as amino acids and creatine, increasing their assimilation by the body. It is indicated for physical activity practitioners and athletes of all disciplines that seek to supply energy for muscle faster recovery (R.M. ALSOP, 1983; T.R. SHAMALA, M.S. PRASAD, 1995).

The prevalence of diabetes is increasing in the worldwide, becoming the epidemic now as a result of aging. (ADA, 2004). However, physical inactivity, poor diet and rising obesity rates are also responsible for the global expansion of diabetes. Hospitalizations attributable to diabetes mellitus represent 9% of hospital expenses of the Health System. Diabetes type 2 or non-insulin dependent or adult onset diabetes and accounts for 90% of diabetes cases. Usually occurs in obese people over 40 years old and currently more frequently in young people, due to bad eating habits, physical inactivity and stress (DSBD, 2014). In this type of diabetes, is the presence of insulin, but its action is hampered by obesity, which is known as insulin resistance, one of the causes of hyperglycemia. Since symptomatic diabetes, genetrally remains for many years without diagnosis and treatment which favors the occurrence of complications in the heart and brain (ADA, 2004).

Thus, weight reduction and improved body aesthetics has often been used as food supplements, popularly considered safe, less invasive and inexpensive, when compared to other methods.However, the biological activity and scientific validation of these supplements still needs for his clinical studies about its thermogenic benefits evidence, thus putting into question the effectiveness of these substances.Furthermore, there is no evidence that these substências promote the reduction of body fat levels and may even promote the health risks and weight maintenance after use. Therefore, should be further evaluated the effects of such supplements for better information to health professionals involved in the prescribing of these food resources, especially for patients with chronic diseases (SAHLIN, 2014).

The objective of this study was to evaluate the effect of supplementation with the ergogenic substance, dextrose on blood glucose levels in type 2 diabetic animals.

METHODS

Thirty-eight Wistar male rats, 14 normoglycemic (N) and 24 diabetic (D) were used. D animals showed a significant reduction in initial body weight (PI): D: 214.6 + 10,3g; N: 237.3 + 3.5g. Figure 1 shows the results obtained after the housing animals in metabolic cages. Food consumption, water consumption, urine volume and glucosuria were analyzed. No change in food consumption in D (30.3 ± 0.9) and N (31.6 + 1.0) were observed in comparision with all groups There was no significant change in water consumption for animals D (52.1 ± 3.6) when compared to N (48.3 +2.4); urinary volume: D: 4.0 + 1.1; N: 4.5 + 1.6); and glycosuria animals: D: + 2.0 and 20.3 N: 17.5 + 3.4. The results obtained for the characterization of the diabetic state of these animals have demonstrated a compensated diabetes, as already described by Arulmozhi et al. (2004).

RESULTS

Thirty-eight male Wistar rats, 14 normoglycemic (N) and 24 diabetic (D) were used. D animals showed a significant reduction in initial body weight (PI): D: 214.6 + 10,3g; C: 237.3 + 3.5. We can observe that the group of diabetic animals showed less weight than non-diabetic group of animals, as shown in Figure 1.

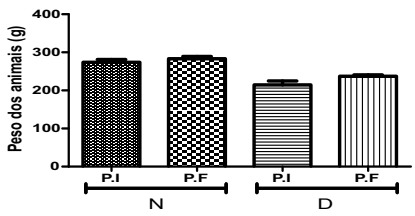

FIGURE 1. Weight of the animals from normoglycemic and diabetic groups

The Figure 2 shows the results obtained after the housing animals in metabolic cages. Food consumption, water consumption, urine volume and glucosuria were analyzed. No change in food consumption when D (30.3 ± 0.9) and N (31.6 + 1.0) compared groups. There was no significant change in water consumption for animals D (52.1 ± 3.6) compared to N (48.3 +2.4); urinary volume: D: 4.0 + 1.1; N: 4.5 + 1.6); and glycosuria animals: D: + 2.0 and 20.3 N: 17.5 + 3.4. The results obtained for the characterization of the diabetic state of these animals have demonstrated that a compensated diabetes, as already described by Arulmozhi ET AL. (2004).

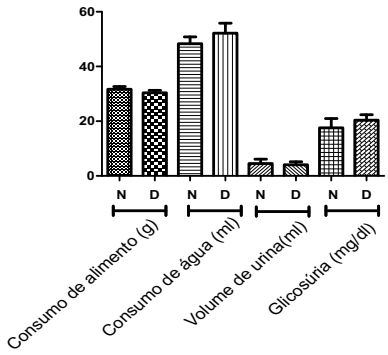

FIGURE 2. Characterization of the diabetic state.

To verify the acute hepatotoxicity caffeine treatment, as were high doses, by determining liver function transaminases ALT and AST in both groups was assessed. The chart below shows the dosages of ALT and AST. Dosages ALT normal group had 144.3 ± 6,27U / L, the diabetic group was 148.9 ± had 13,94U / L, since the diabetic group treated with 2.1g / kg 146.5 ± presented dextrose 5,03U / L. Dosages AST normal group were 51.11 ± 1,1U / L, untreated diabetic group was 44.17 ± 3,1U / L and the diabetic group treated with 2.1g / kg dextrose showed 49.44 ± 1,5U / L, as shown in Figure 3. the data together indicate that there is no significant change in liver function by administration of dextran.

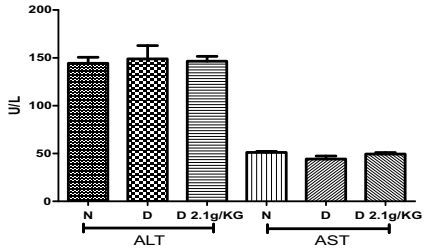

FIGURE 3. Determination of ALT and AST.

The Figure 4 shows the data for initial dosing of glucose, and after 30min and 60min of glucose administration. The normal group had baseline blood glucose level of 95.40 ± 4,3mg / dl 30min to 144.00 ± 3,73mg / dl 60min and 114.90 ± 7,43mg / dL. The untreated diabetic group had a baseline blood glucose level of 85.28 ± 3,1mg / dl 30min to 155.50 ± 9,6mg / dl and 121.10 ± 60min 7,6,0mg / dL. Already the diabetic group treated with dextrose (2.1g / kg) showed an initial blood glucose level of 96.80 ± 46,6mg / dL to 148.50 ± 30min 3,10,6mg / dL and 136 60min, 50 ± 7,11,9mg / dL. The results indicate that dextrose does not change the glycemic profile of diabetic animals, no significant inducing glucose intolerance in the animals.

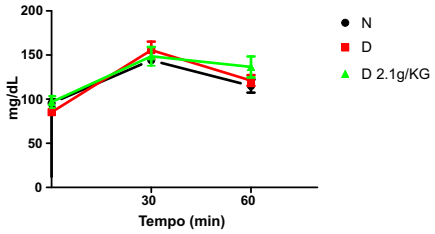

FIGURE 4. Glucose Tolerance Test (GTT) of normoglycemic animals, diabetics and diabetics treated with dextran.

CONCLUSION

Our results indicate that supplementation with dextrose an ergogenic substance often used in physical activities and exercise does not induce a state of hyperglycemia in diabetic animals or abnormal liver function in these animals. However, their prescription and use should be controlled diabetic patients. Clinical trials should be conducted to confirm this effect.

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Avenida Colombo, 5790 - Jardim Universitário.
Maringá – PR

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ABSTRACT

The prevalence of diabetes is increasing worldwide, setting up currently as a result epidemic, largely of aging. However, physical inactivity, poor diet and increasing obesity are also responsible for the global expansion of diabetes. The ergogenic nutritional supplements are those that can promote increased physical performance beyond the physiological capacity and have a thermogenic action in the body. However, the biological activity and scientific validation of these supplements still require studies for clinical evidence as to its thermogenic benefits, thus casting doubt on the effectiveness of these substances. The objective of this study was to evaluate the effect of supplementation with dextrose on blood glucose levels in diabetic animals 2. For this type was used 38 male Wistar rats, 14 and 24 normoglycemic diabetic animals were subjected to metabolic cage in order to verify the consumption of food and water, urine volume and glucosuria, after that were treated with dextrose, and subjected to biochemical tests. Our results indicate that supplementation with dextrose, one ergogenic substance often used in physical activities and exercises no induces hyperglycemia in diabetic animals or abnormal liver function in these animals

KEYWORDS: Diabetes; dextrose; hyperglycemia.

EFFET DE LA SUPPLÉMENTATION AVEC DE LA CAFÉINE SUR LES NIVEAUX GLICEMIC DANS LE TYPE EXPÉRIMENTAL 2 DIABÈTE

RÉSUMÉ

La prévalence du diabète est en augmentation dans le monde entier, la mise en place actuellement une épidémie de résultat, en grande partie du vieillissement. Cependant, l'inactivité physique, la mauvaise alimentation et l'obésité croissante sont également responsables de l'expansion mondiale du diabète. Les suppléments nutritionnels ergogéniques sont ceux qui peuvent favoriser l'augmentation des performances physiques au-delà de la capacité physiologique et avoir une action thermogénique dans le corps. Toutefois, l'activité biologique et la validation scientifique de ces suppléments nécessitent encore des études pour preuve clinique que de ses avantages thermogénique, jetant ainsi le doute sur l'efficacité de ces substances. L'objectif de cette étude était d'évaluer l'effet de la supplémentation avec du dextrose sur les niveaux de glucose dans le sang chez les animaux diabétiques 2. Pour ce type a été utilisé 38 rats mâles Wistar, 14 et 24 animaux diabétiques normoglycémiques ont été soumis à cage métabolique pour vérifier la consommation de nourriture et d'eau, le volume d'urine et de glucosurie, après qui ont été traités avec du dextrose, et soumis à des tests biochimiques. Nos résultats indiquent que la supplémentation avec du dextrose, une substance ergogénique souvent utilisé dans les activités physiques et ne exerce aucun induit une hyperglycémie chez les animaux diabétiques ou une fonction hépatique anormale chez ces animaux

MOTS-CLÉS: diabète; dextrose; hyperglycémie.

EFECTO DE LA SUPLEMENTACIÓN EN NIVELES DE DEXTROSA EN EL TIPO 2 DIABETES EXPERIMENTAL GLUCÉMICO

RESUMEN

La prevalencia de diabetes está aumentando en todo el mundo, estableciendo actualmente como una epidemia resultado, en gran parte del envejecimiento. Sin embargo, la inactividad física, la mala alimentación y el aumento de la obesidad también son responsables de la expansión mundial de la diabetes. Los suplementos nutricionales ergogénicos son aquellos que pueden promover el aumento de rendimiento físico más allá de la capacidad fisiológica y tienen una acción termogénica en el cuerpo. Sin embargo, la actividad biológica y la validación científica de estos suplementos todavía requieren estudios para su prueba clínica en cuanto a sus beneficios termogénicos, poniendo así en duda la eficacia de estas sustancias. El objetivo de este estudio fue evaluar el efecto de la suplementación con dextrosa en los niveles de glucosa en sangre en animales diabéticos 2. Para este tipo se utilizó 38 ratas Wistar macho, 14 y 24 animales diabéticos normoglucémicos fueron sometidos a jaula metabólica con el fin de verificar el consumo de alimentos y agua, volumen de orina y glucosuria, después de que fueron tratados con dextrosa, y se somete a pruebas bioquímicas. Nuestros resultados indican que la suplementación con dextrosa, una sustancia ergogénico utiliza a menudo en las actividades físicas y ejerce no induce la hiperglucemia en los animales diabéticos o función hepática anormal en estos animales

PALABRAS CLAVE: Diabetes; La dextrosa; hiperglucemia.

EFEITO DA SUPLEMENTAÇÃO COM DEXTROSE SOBRE OS NÍVEIS GLICÊMICOS EM RATOS DIABÉTICOS TIPO 2

RESUMO

A prevalência do diabetes vem crescendo mundialmente, configurando-se atualmente como uma epidemia resultante, em grande parte, do envelhecimento da população. Contudo, o sedentarismo, a alimentação inadequada e o aumento da obesidade também são responsáveis pela expansão global do diabetes. Os suplementos nutricionais ergogênicos são aqueles que podem promover aumento do desempenho físico além da capacidade fisiológica, e apresentam uma ação termogênica no organismo. Entretanto, a atividade biológica e validação científica destes suplementos ainda carecem de estudos para a sua comprovação clínica quanto aos seus benefícios termogênicos, colocando assim em dúvida a eficiência dessas substâncias. O objetivo deste trabalho foi avaliar o efeito da suplementação com dextrose, sobre os níveis glicêmicos em animais diabéticos tipo 2. Para isso foi utilizado 38 ratos machos da linhagem Wistar, sendo 14 normoglicêmicos e 24 diabéticos, os animais foram submetidos a gaiola metabólica afim de verificar o consumo de água e alimento, volume de urina e glicosúria, após isto foram tratados com dextrose, e submetidos aos testes bioquímicos. Nossos resultados indicam que a suplementação com dextrose, uma substância ergogênica, frequentemente utilizada em atividades físicas e exercícios não induz um estado de hiperglicemia em animais diabéticos ou alteração da função hepática nestes animais

PALAVRAS-CHAVE: Diabetes; Dextrose; hiperglicemia.